Let’s GREEN EU’s economy!

Skills for sustainable, resilient, and socially fair communities

9 June 23

EUROPEAN YEAR OF SKILLS

Up2Circ SURE5.0

3-11 June 2023

#EUGreenWeek

PARTNER EVENT

Let’s make Europe more circular!

Funded by the European Union

Opportunities for SMEs with Up2Circ

Silke Schleiff, TUTECH INNOVATION

Up2Circ

TUTECH
FUNDECYT PCTEX
CAMERA DI COMMERCIO INDUSTRIA ARTIGIANATO E AGRICOLTURA DI TORINO
TARTU SCIENCE PARK Home of Business
LUBELSKA FUNDACJA ROZWOJU
risingSUD Attractivité et développement économique de la région Sud

Relevance of Circular Economy

- Climate change
- Consumption of virgin resources
- World population
- ★ The world's current circularity gap is over 90%

Necessary steps

- CO2-neutrality
- Decoupling growth from resource use

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The New Circular Economy Action Plan

"the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance towards keeping its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade"

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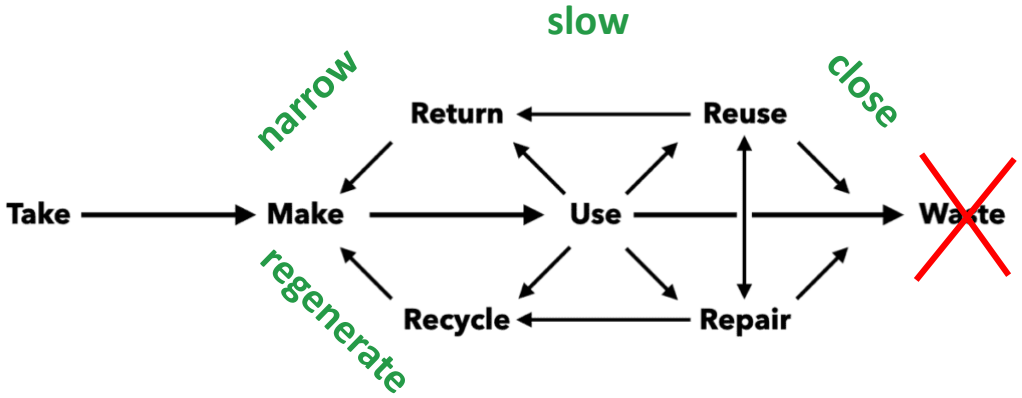
Introduction to Circular Economy



Main principles of the circular economy:

- Eliminate waste and pollution
- Circulate products and materials at their highest value
- Regenerate natural systems

The circular economy offers a profitable opportunity to

- move away from resource-intensive processes,
- maximise the use of existing assets,
- create new revenue streams and preserve natural capital

Did you know that up to 80% of products' environmental impacts are determined at the design phase?

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Understanding opportunities of the circular economy in contrast to the inefficiencies of linear economy

Example: Manufacturer of playground equipment

Use of materials

Are durability and recyclability a criterium for material selection?

Product lifetime

Are reparability, modularity and upgradeability considered?

Product capacity

Do your products realise their full potential?

End of life value

How do you imagine the end of lifetime for your product?

Kids grow fast, interests change…

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Approaches for circular innovation

Product innovation	Process innovation	Business model innovation
Use of materials		
Design the product for closed loop recycling	Substitution of virgin raw materials by bio-based or recycled materials	Build a circular supply chain
Product lifetime		
Use modular design that may be adjusted when kids grow	Apply LEAN manufacturing processes with standardized parts	Develop a portfolio for product life extension
Product capacity		
		Swings as a service for a monthly fee
End-of-life value		
Design products to be remanufactured	Apply ICT processes enabling reverse logistics and refund system	Offer a take-back scheme

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Up2Circ

Boosting the uptake of circular business model, product and process innovation

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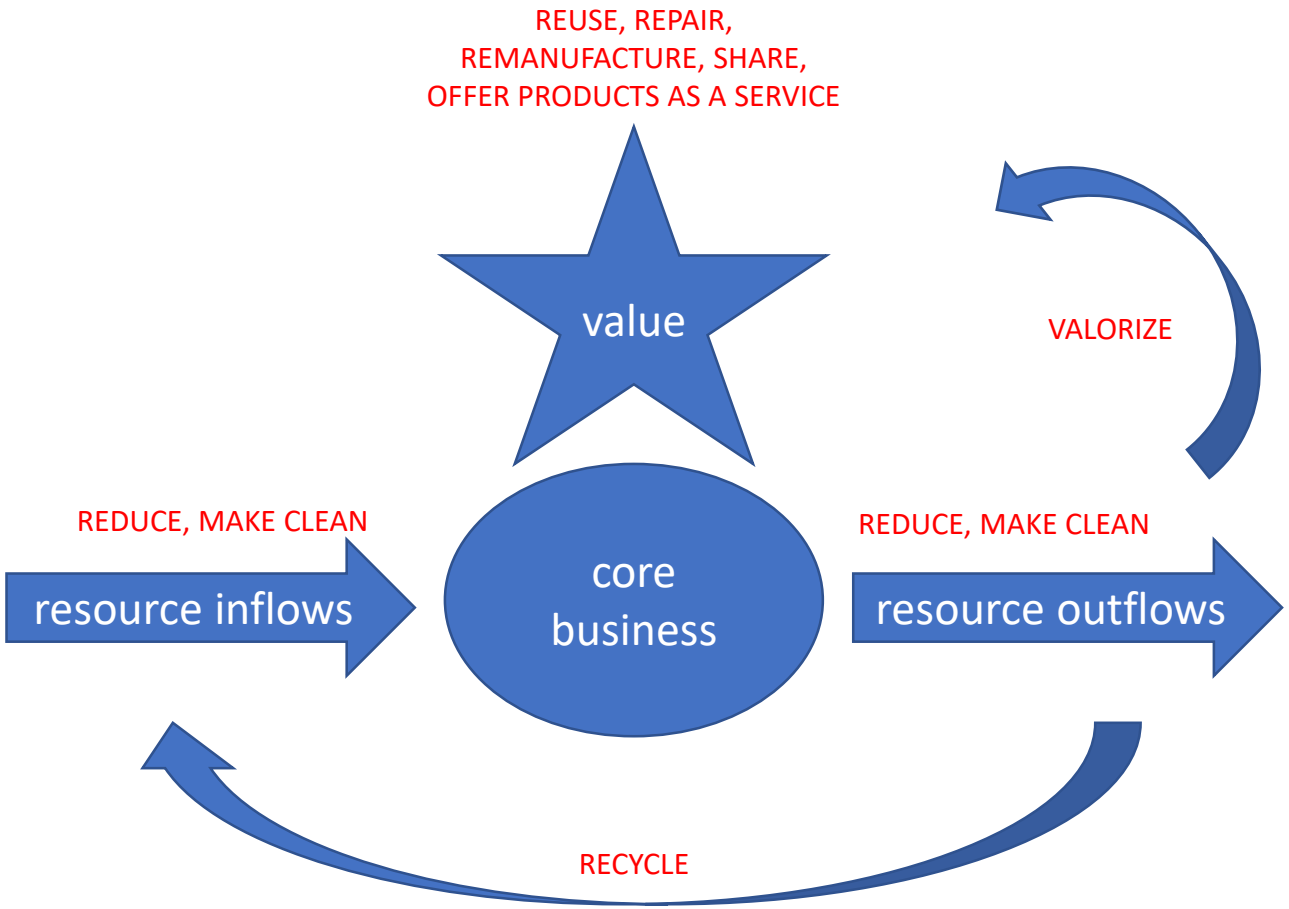
Innovation opportunities for your business



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How did other companies transform towards circular economy?

KODAS is a producer of high-quality natural fermented drinks and other products, located in Southern Estonia.

Challenge

The main waste in the production process of juice and juice drinks is the pressing residue of apples or other fruits. Until recently, the pressing residues were useless bio-waste for the company, which had to be composted and the associated costs had to be covered.

Solution

Kodas has developed a technology for refining the press residue for human consumption. For example, recipes for fiber-rich apple and berry purees have been developed. This makes the entire production process more environmentally friendly and economically efficient. Besides the significant increase in resource efficiency, the residue-based products have helped to enrich the product range of Kodas.

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How did other companies transform towards circular economy?

siebold/hamburg provides all kinds of services in the field of design and construction of exhibition stands and shop fittings as well as the procurement and storage of related materials.

Challenge

Exhibitions only take place for few days, but for a successful trade fair appearance the booths should catch the eye and every customer has special wishes and requirements. Nevertheless siebold/hamburg wanted to offer a climate-neutral trade fair presence.

Solution

Siebold/hamburg applies the most economical use of materials and a high level of reuse. Using the software UMBERTO for Carbon Footprint, alternative material and storage lists can be evaluated with their reusability and recycling proportions and CO2 emissions of the booth can be calculated. Partnering with ForestFinance Group customers can offset the remaining CO2 emissions.

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How did other companies transform towards circular economy?

FAGUM STOMIL is a Polish manufacturer of safety footwear that has been operating since 1899. It produces footwear made from polymers for industrial and household applications.

Challenge

The company already used recycled materials but was still facing high production and energy costs and high environmental charges for disposal of production wastes.

Solution

Fagum Stomil introduced the world's first industrial recycling technology for used EVA footwear. Material from production waste, that was previously disposed of in a landfill or incineration plant, is recovered and customers are invited to return their end-of-life wellingtons. Thanks to the use of waste materials and to saving charges for disposal, the company could significantly reduce production costs.

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Client journey to circularity

STEPS TO MAKE BUSINESS MORE CIRCULAR

1. AWARENESS LOOP

Wake-Up2Circ

2. SKILLS LOOP

Up2Circ Academy

3. RESULTS LOOP

UP2Circ Incentive Scheme

4. EXPLOITATION LOOP

Up2Circ SME ambassadors

Your Up2Circ client journey

Up2Circ

- Explore opportunities to innovate towards circularity and discover benefits for your company!
- Design a detailed action plan based on an in-depth assessment. Participate in a comprehensive set of learning modules for circular business model, product and process innovation!
- Implement transition measures with support of EU-funding! Up2Circ Incentive Scheme supports the uptake of circular business models (<15.000€) and the uptake of circular product or process innovation (<50.000€)
- Belong to a network of Up2Circ SME ambassadors and share your success story with other SMEs and stakeholders within the EU innovation support ecosytem

To apply for funding in Up2Circ Incentive Scheme, prior active involvement in Up2Circ Academy is required!

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This project targets SMEs!

Are you are a small or medium sized enterprise according to the EU definition?

- < 250 staff headcount
- ≤ € 50 m turnover or
- ≤ € 43 m balance sheet total
- To check if you are eligible as an SME please use the EU self assessment questionnaire

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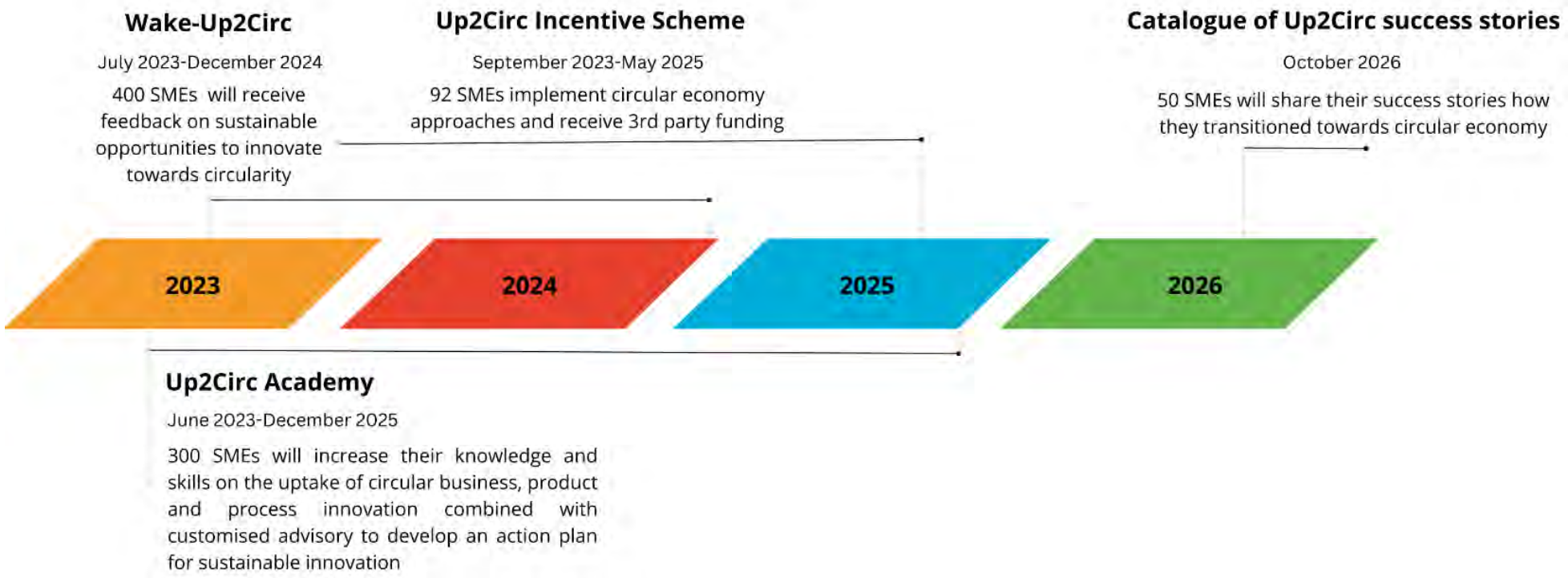
Project timeline

Pilot run starts
June 2023
Call deadline: 11/2023

First open loop starts
November 2023:
Call deadline: 5/2024

Second open loop
starts May 2024
Call deadline: 5/2025



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Let’s make Europe more circular!

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https://up2circ.eu/

Up2Circ

SURE5.0

09/06/2023

Diego Carballo – European projects manager, Aerospace Valley
carballo@aerospace-valley.com

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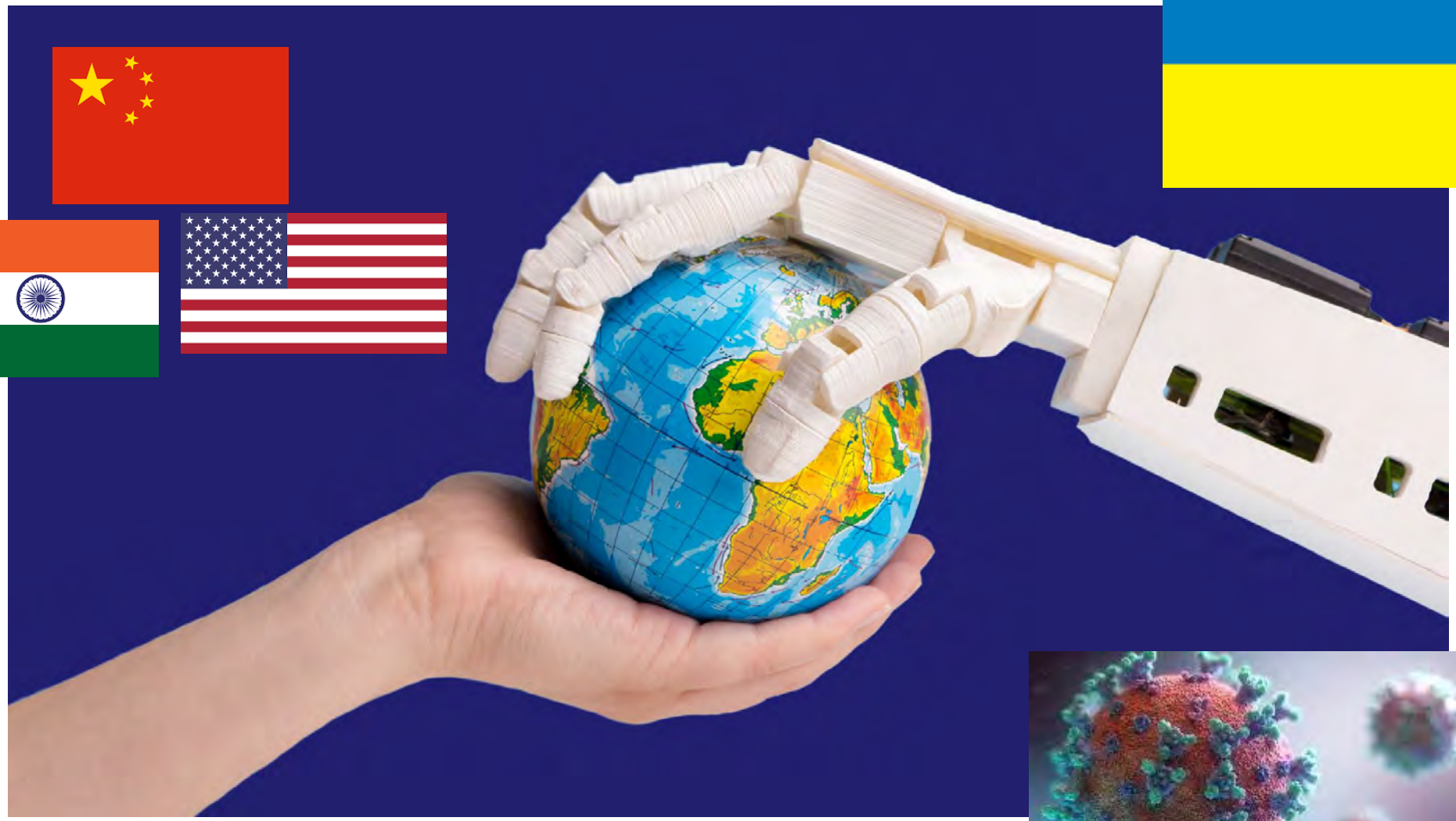
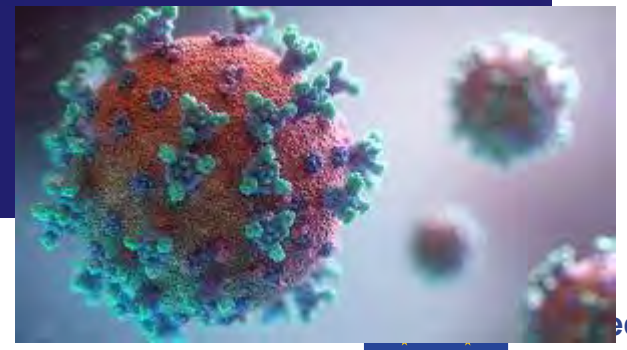
SURE5.0

The Rationale





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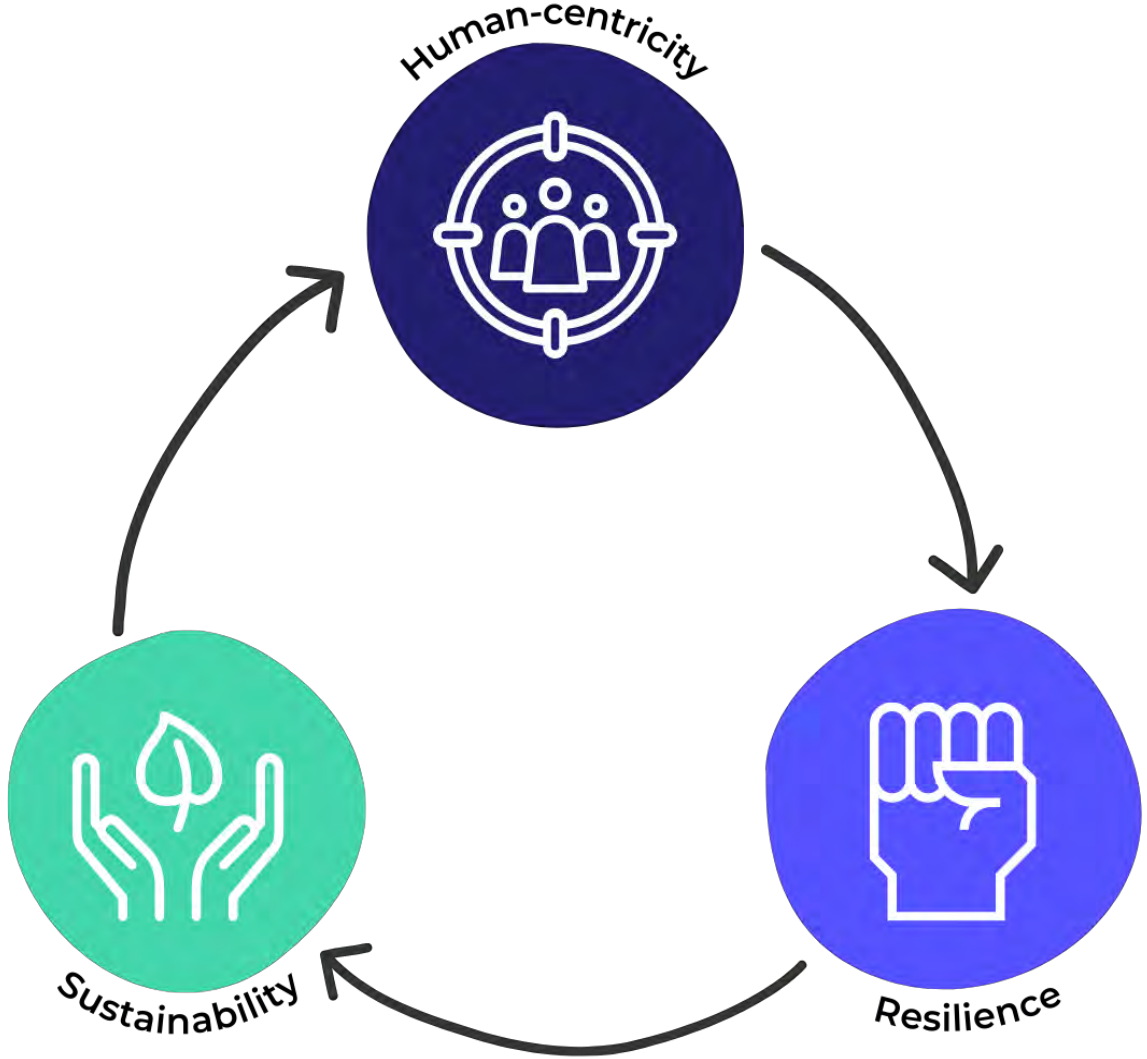
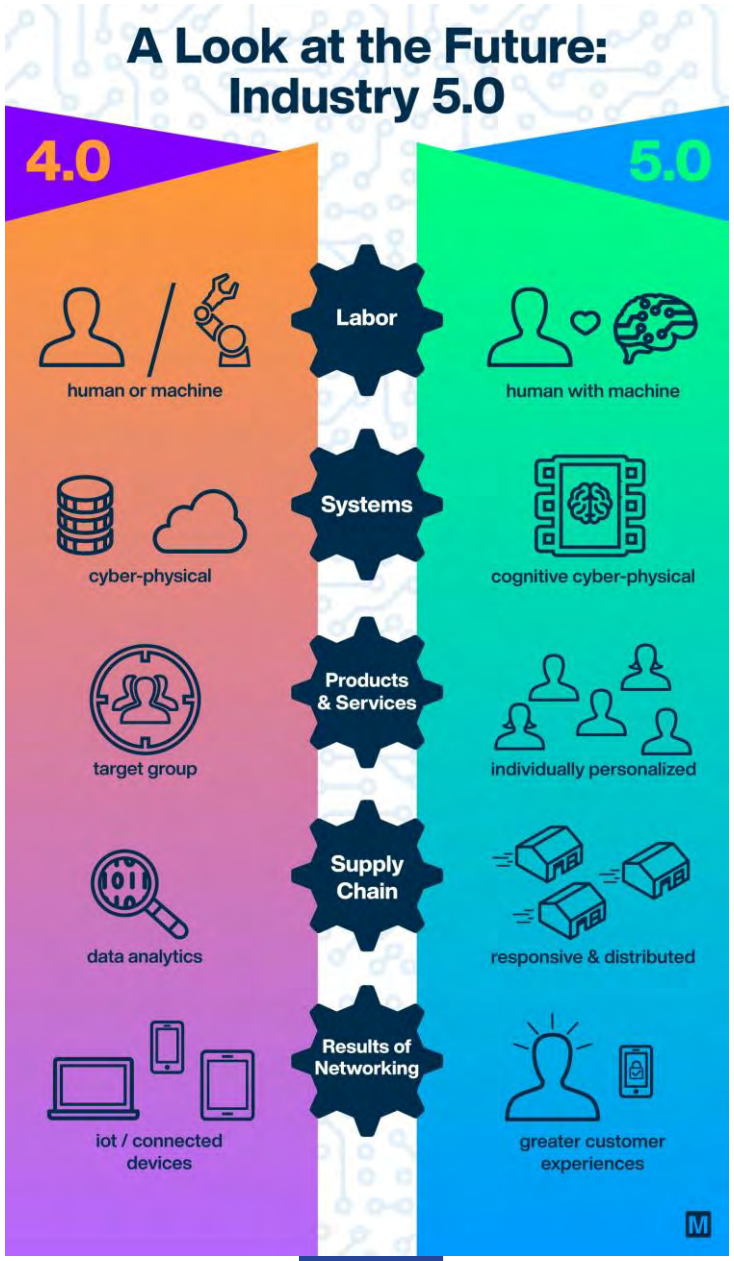
What is Industry 5.0?





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Added Value?

→ Cost Reduction

→ Sustainable Solutions

→ Mass Customization and Personalization

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WHO WE ARE?

11 Partners

8 Countries

- Aerospace Valley - France
- CEAGA - Spain
- Silicon Alps - Austria
- Corallia - Greece
- ANFIA - Italy
- F6S - Ireland
- Fraunhofer IPT - Germany
- AIMEN - Spain
- TALTECH - Estonia
- INIZIATIVA - Italy
- EIT MANUFACTURING West - Spain

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THE PROJECT

The SURE5.0 project aims to **support European SMEs** to advance in their digital transformation process while becoming more human-centric, sustainable and resilient.

FOCUS ON THREE STRATEGIC INDUSTRIAL ECOSYSTEMS

>> **10%** added value in Europe

>> **2** million companies

>> **20** million employees

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THE PROJECT – KEY FACTS

TOPICS

Twin transition
Digital + Green

Advanced Technologies for Industry

Social **Innovation**

CALL

HORIZON-CL4-2021-RESILIENCE-01-29 – 'Innovate to transform' support for SME's sustainability transition (CSA)

Horizon Europe

BUDGET

€ 4,988,125

From which more than €2.6 million will be addressed to SMEs for financing their 5.0 projects.

DURATION

Jun 2022 — 36 months — **May 2025**

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WHAT CAN WE OFFER TO SMES?

- 5.0 assessment **reports**
- Open **webinars**
- Individual **roadmaps**
- **Tailored services**
- **Networking** and peer-learning events
- **Financial support** for their 5.0 projects

THE PROJECT EXPECTS TO INVOLVE AROUND 1,000 SMES

>> **700** will be assessed

>> **90** will be provided with tailored services from partners

>> **53** will receive financial support

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HOW TO PARTICIPATE?

1 IF YOU ARE A MANUFACTURING SME REQUIRING SUPPORT IN INDUSTRY 5.0

1

SELF ASSESSMENT

Assess your plant regarding industry 5.0 and receive automatic recommendations

Any SME from our key industrial ecosystems can participate

2

5.0 AWARENESS

Access to open webinars to keep updated about industry 5.0

SMEs filling last questionnaire will be automatically invited

3

TAILORED SERVICES

Apply to an open call with a short version of your 5.0 project and receive individual recommendations

Selected SMEs will receive tailored services from partners and could join our Community

4

FINANCING HELP

Apply to an open call submitting a detailed version of your 5.0 project

Selected SMEs will receive funding for their projects' implementation

5

TRANSFORMATION

Initiate your transformation project, being accompanied during the process

Project implementation and monitoring

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HOW TO PARTICIPATE?

2 **IF YOU ARE A SERVICE PROVIDER INTERESTED IN SURE5.0** → Register in our **catalogue of complimentary service providers**

3 **IF YOU ARE ANY OTHER STAKEHOLDER INTERESTED IN SURE5.0** → Join our **Community of Practice Alliance**

More information:

www.sureproject.eu

info@sureproject.eu

Stay informed about the progress of the project by subscribing to **our newsletter**

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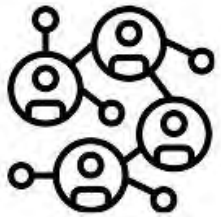
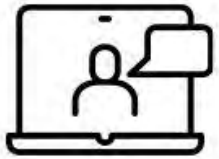
COMMUNITY OF PRACTICE ALLIANCE

Aimed to

SMEs
Technological providers
National EU business support networks
Centers and/or initiatives around Industry 5.0
Other relevant stakeholder interested in Industry 5.0



Connect with other entities related with Industry 5.0



Peer learning activities

Networking activities

Good practices and success stories

Join the Community

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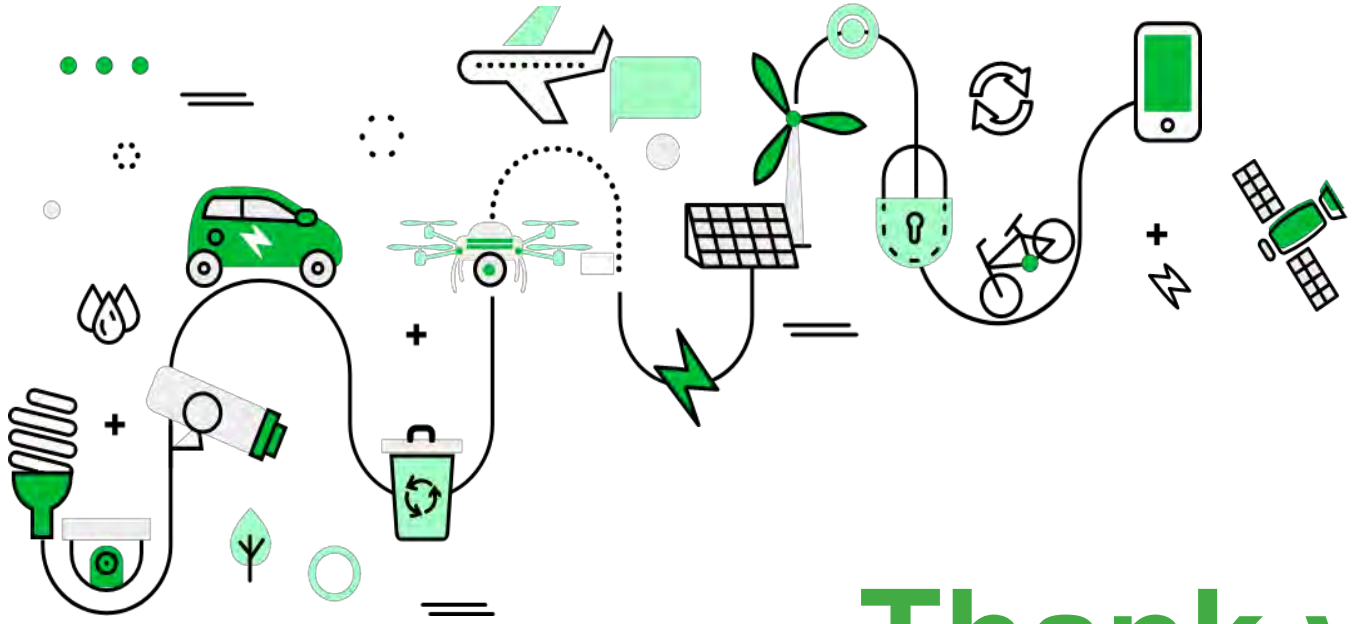
Find more at
www.sureproject.eu



SURE5.0

Thank you

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ENERFAST

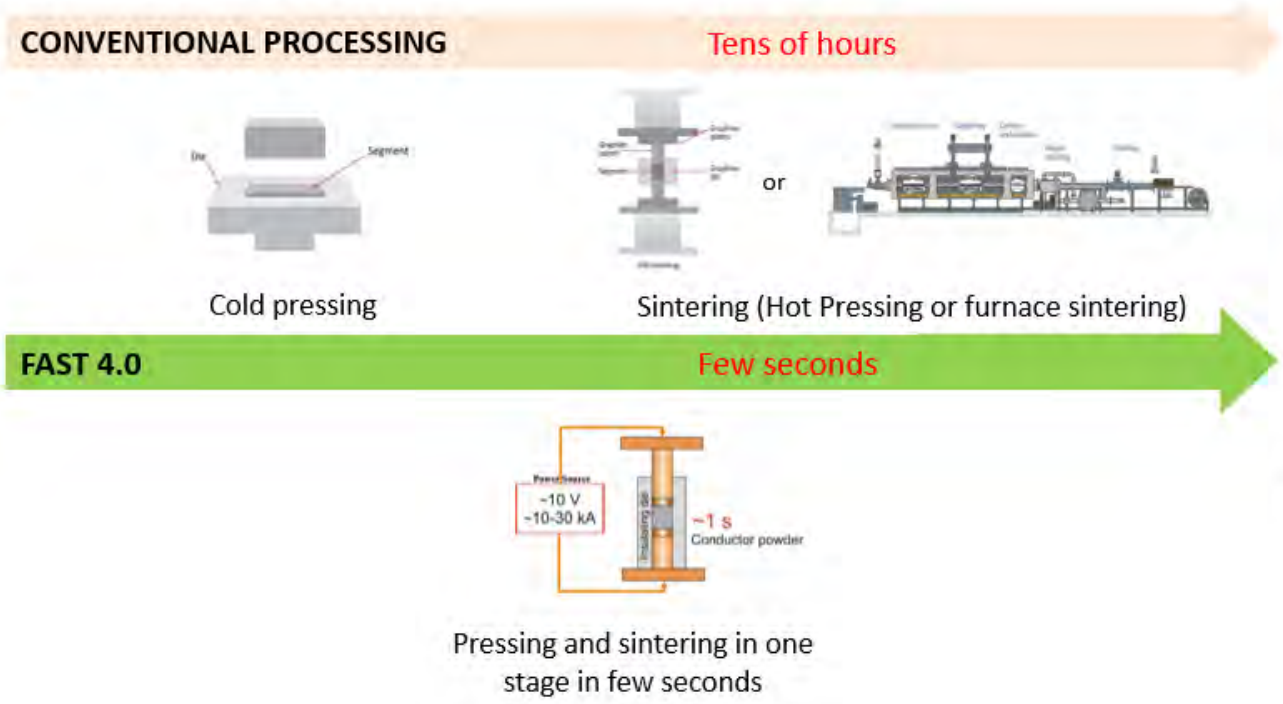
A concrete case of sustainability in the manufacturing process

eit Manufacturing

Co-funded by the European Union

INTRODUCTION

ENERFAST will develop new FAST sintering technology for the efficient fabrication of advanced components (diamond tools and brake pads).



Advanced tools: metal diamond, abrasives, cermets

Current processing of diamond tools and friction materials is not efficient in terms of energy consumption and processing time

In addition, conventional processing by Hot Pressing is expensive due to the tooling costs (graphite dies).

ENERFAST project is developing a new manufacturing technology to help sintering technology users to reduce process time while increasing efficiency and sustainability by adopting the new technology.

Reduction in 20 % of energy consumption and 20 % in tooling costs.
Increase in productivity for small series of pieces. Productivity 120-150 components/hour

Main output of the project will be a new technology to be exploited by AFT and applied to two use cases.

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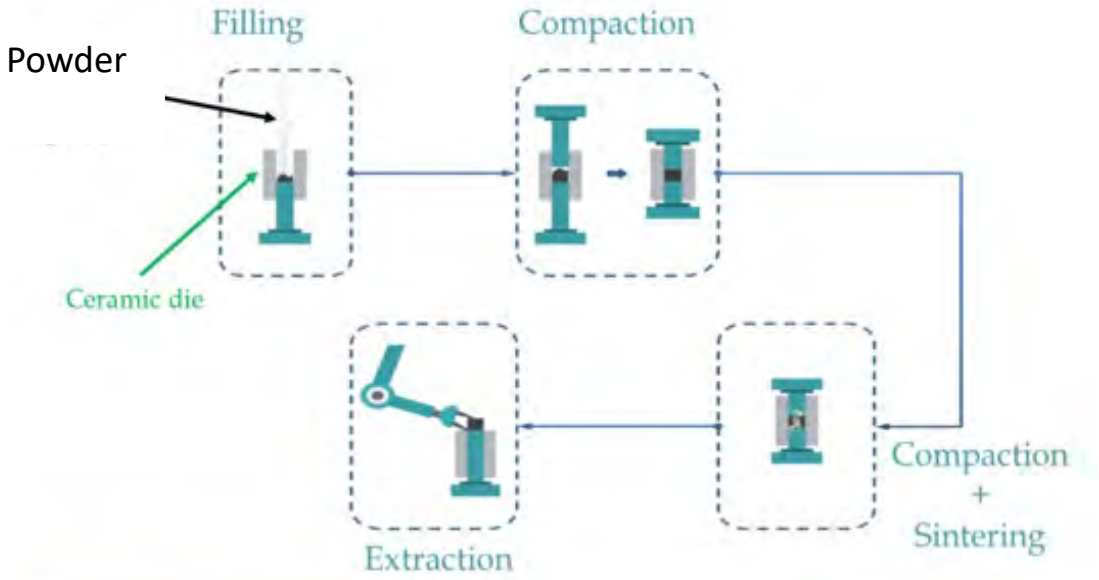
ENERFAST PROCESS



Metal-diamond segment for stone cutting tools or friction materials

ENERFAST is based in electric sintering but improving the performance using different pulses of current. ERS technology will simplify the production process as the new machine will substitute cold presses and furnaces by one single machine. The whole process from the initial powder to the final tool is performed using the same machine.

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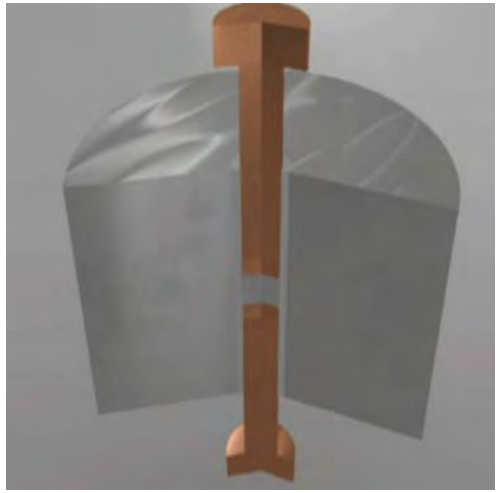
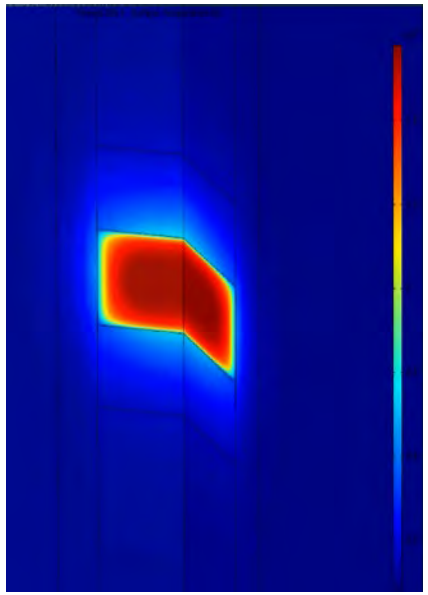
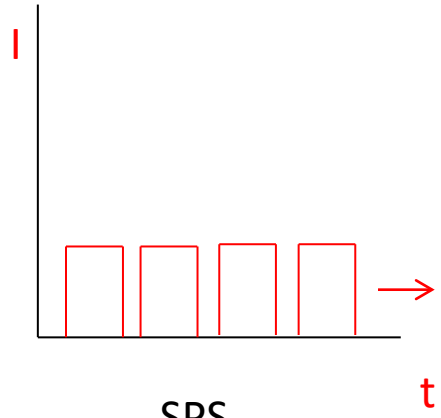
[1] Lagos et al, METAL-DIAMOND MATERIALS OBTAINED BY ELECTRIC RESISTANCE SINTERING: MICROSTRUCTURE, PROCESSING AND MECHANICAL PROPERTIES, EUROPM21 proceeding, 2021.

ENERFAST PROCESS



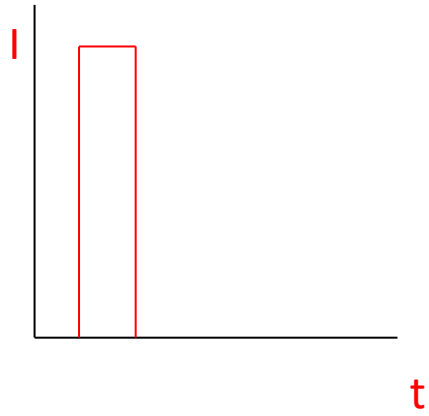


Compared to other FAST processes:



SPS

Electric characteristics: low voltage (< 10 V), low current (< 1KA/cm^2)
Vacuum or inert gas
Time: minutes
Conductive moulds (graphite)



ENERFAST (ERS)

Electric characteristics: low or medium voltage (< 40 V), high current (> 5KA/cm^2)
With or without protective chamber
Time: < 1 s
Dielectric moulds

ENERFAST is a variation of ERS using controlled electric pulses of different voltages

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ENERFAST PROCESS

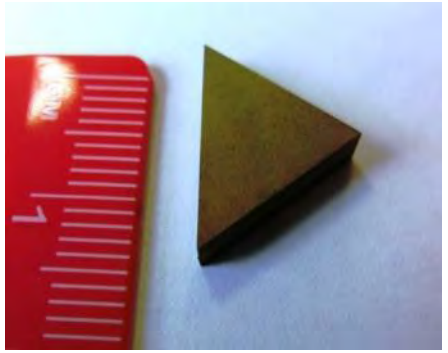
Only for conductive materials.

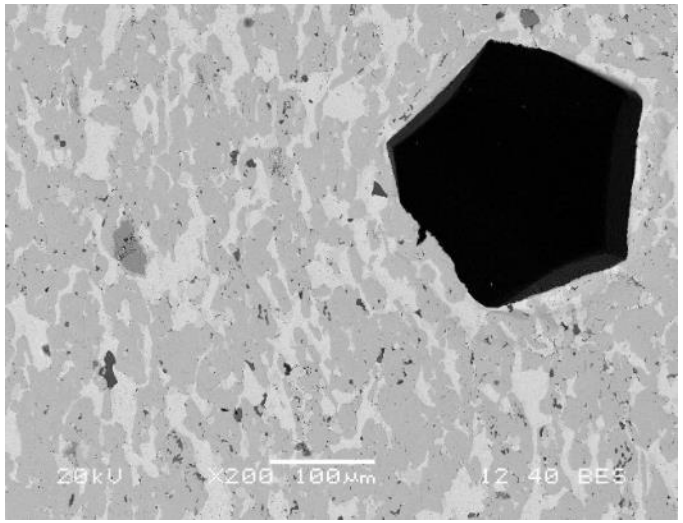
Typical size of the pieces is around 25-35 mm diameter.

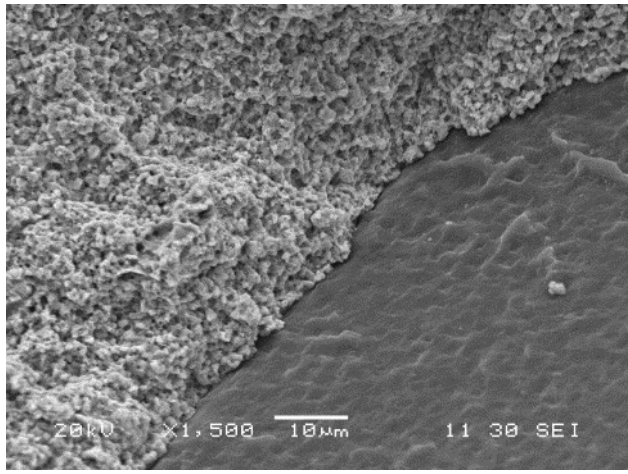
Limited geometrical complexity.

Very limited diffusion of materials. Small grain size.

Graphitization of diamond not produced due to short time.







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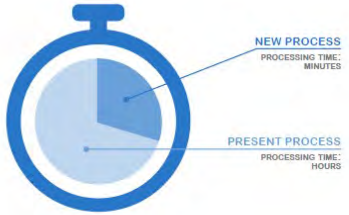
COMPETITIVE ADVANTAGE

EFFICIENCY

Time &
Energy Savings



FLEXIBILITY

Customised
Products

EASY IMPLEMENTATION

No Protective
Atmosphere

ENERFAST technology has been developed by TECNALIA (EP 16382069.9)

In addition to the lower energy consumption:

- An important advantage of the technology is the **flexibility in the composition of the metal binder in diamond tools**. The ENERFAST technology can be used with iron-based binders that are difficult to process by conventional sintering due the week interface between diamond and metal. This could open the possibility of working with **Fe based binders** instead of Co based ones (cobalt is a CRITICAL material for the EU).
- Improved densification obtained by ENERFAST process will **reduce the dust generation** of brake pads.
- ENERFAST machine will use **ceramic dies** that can be re-used for a long time.
- At the same time, processing time is very short (seconds instead of minutes/hours) and performed in air **avoiding controlled atmosphere** and reducing the energy consumption.

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USE CASES

ENERFAST process will be developed for two use cases: metal diamond segments for DELLAS and friction materials (brake pads) for FRENOTECNICA

DELLAS is a metal-diamond tools producer. FRENOTECNICA produces friction materials for brake pads mainly for motorbikes.

Metal-diamond tools are well established in the mining sector for the cutting of granite, marble, and others. These tools consist of two main elements, **the steel core and the segments** based on diamond particles surrounded by a metal matrix.

Friction materials (like brake pads) are metal based composites obtained by Powder Metallurgy.

Both use cases are fabricated by hot pressing or using the conventional PM process based on cold pressing and sintering. For high quality products that require high density, hot pressing is the most suitable conventional method. However, **costs of processing are very high** due to the cost of the graphite tooling and the high energy consumption.

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CONSORTIUM

TECHNOLOGY DEVELOPMENT

tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

aft
THINK FLEXIBLE

END USER/ VALIDATOR

dellas GROUP

ft frenotecnica s.r.l.

SCIENTIFIC AND EXPLOITATION SUPPORT

HIT
HUBINNOVAZIONETRENTINO

UNIVERSITAS ATHESINA STUDIORUM
UNIVERSITY OF TRENTO

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CONSORTIUM

AFT – BUSINESS IMPLEMENTER AND TECNOLOGY DEVELOPER

Design and manufacturing of special machines since 1963.

AFT is leading precision-machines manufacturer focused on mission-critical applications. AFT provides machines to the automotive market for the fabrication of friction materials and to the tools market, through its three active Brands COMEC (Automotive friction materials), ARGA and FABES (industrial sectors).

AFT provides strategic custom-made assets such as machines and system solutions driven by undisputable technology leadership and through a global presence and strengthening its leadership position.

AFT will commercialize the ENERFAST machines as a new product within the portfolio, supposing a competitive advantage over competitors.

The engineering department of AFT is performing the co-development of the technology with TECNALIA.

CONSORTIUM

TECNALIA - TECHNOLOGY DEVELOPER

tecnalia

MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

TECNALIA is the largest center of applied research and technological development in Spain, a benchmark in Europe and a member of the Basque Research and Technology Alliance.

TECNALIA has experience in electric sintering from 2007 and patented the ENERFAST process developed within two European projects (EFFIPRO and FASTRAM).

The project is leaded by Dr Iñigo Agote with wide experience in electric sintering and powder metallurgy.

CONSORTIUM

SCIENTIFIC AND EXPLOITATION SUPPORT

UNIVERSITY OF TRENTO

The University of Trento will support the project in the definition of requirements and material properties and in the characterization of developed materials and tools. Specifically, University of Trento will support DELLAS/FRENOTECNICA in the validation of the final products.

The Project is being performed within the Powder Metallurgy R&D centre leaded by Professor Alberto Molinari.

HIT HUB INNOVAZIONE TRENTINO

HUB Innovazione Trentino will support the technology transfer industrial partners in order to guarantee a proper in the exploitation of the results. In addition, HIT will lead the dissemination and training activities.

The Trentino Innovation Hub Foundation (HIT) is the instrumental body of the Autonomous Province of Trento, and an organization to research and distribute knowledge pursuant to European Union regulations. HIT promotes and enhances the scientific-technological research activities and results of its founders.

Exploitation activities during the project will be leaded by Silvio Antonioni who is focused on licensing technologies backed by intellectual property rights and developing its optimal commercialization strategy.

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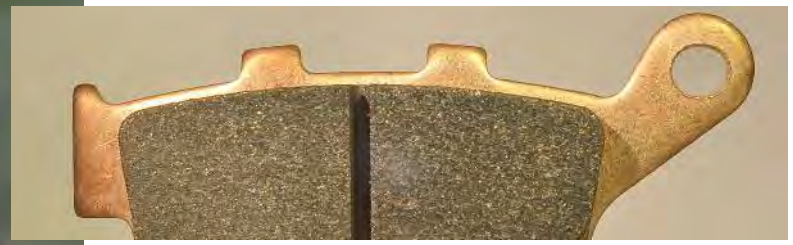
CONSORTIUM

END USERS

Dellas Spa, an Italian company, has reached a leading position in the international market of the production and sales of diamond tools after 40 years of activity.
DELLAS will test the tools produced within their R&D department.

FRENOTECNICA produces brake pads mainly for motorbikes through the name BRENTA.
FRENOTECNICA will test the brake pads produced within their R&D department.



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TASKS

T1. PROJECT MANAGMENT AND COORDINATION

T2. DEFINITION OF REQUIEREMENTS OF THE APPLICATION AND EQUIPMENT

T3. DESIGN AND DEVELOPMENT OF THE TECNOLOGY/MACHINE

T4. FABRICATION OF TOOLS

T5. VALIDATION OF TECHNOLOGY AND FIELD TESTING

T6. BUSINESS MODEL VALIDATION AND DISSEMINATION

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TASKS

WPs	Participants	Jan	Feb	Mar	Apr	May	Jun	Jul	Ag	Sep	Oct	Nov	Dec
T1: MANAGEMENT AND PROJECT COORDINATION	TEC												
T1.1, Project coordination, financial and administrative management	TEC												
T1.2. Scientific project coordination, risk and quality management	TEC												
T2: DEFINITION OF REQUIEREMENTS OF THE APPLICATION AND EQUIPMENT	ALL												
T2.1. Requirements of tools: geometry, material and properties													
T2.2. Requirements for ENERFAST equipment													
T3. DESIGN AND DEVELOPMENT OF THE TECNOLOGY/MACHINE	TEC, AFT, U. Trento												
T3.1. Modification of ERS equipment for the fabrication of tools: equipment and dies													
T3.2. Definition of process parameters													
T3.3. Characterization of materials													
T4. FABRICATION OF TOOLS	AFT, TEC												
T4.1. Fabrication of tools													
T5. VALIDATION OF TECHNOLOGY AND FIELD TESTING	ALL												
T5.1. Field testing													
T5.2. Evaluation and validation of the technology													
T6. BUSINESS MODEL VALIDATION AND DISSEMINATION	ALL												
T6.1. Dissemination and communication to stakeholders and end users													
T6.2. Commercialization Strategy and activities													
T6.3. Market scenario and opportunities for industrial replication of results													
T6.4. Development of a business plan and IPR													

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SUMMARY

ENERFAST project is developing a FAST-sintering technique for efficient and sustainable fabrication.

The objective is to upgrade the technology for two use cases: diamond tools and friction materials.

Project is focused in two use cases, but there are other possible applications in the future: magnetic materials, thermoelectrics, hard materials, biomaterials, etc.

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Thanks for your attention!

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